MECHANISM OF ANODIC OXIDATION OF ORGANIC COMPOUNDS ON PLATINUM

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Abstract*

The oxidation of organic compounds (alcohols, aldehydes, formic acid, etc.) on platinum electrodes is greatly affected by adsorption phenomena. Adsorption of reacting species on the inhomogenous surface leads to a fractional reaction order, which is valid over a large concentration range. Increasing oxygen-coverage of the surface lowers the reaction-rate by an exponential law. Three arrests on the oxygen part of the charging curve on platinum correspond to three regions of current decrease on anodic current-potential curves.

Oxidation and reduction reactions are also affected by adsorption of surface active ions or molecules. In some cases this influence can be attributed to blocking action and to desorption of reacting species from the surface.

The experimental results are interpreted on the bases of a nonelectrochemical rate-determining step - dehydrogenization with formation of adsorbed H-atoms or oxidation by adsorbed OH-radicals.

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